

Nonfatal Skin Diseases and Disorders in Construction

Work-related skin disorders can be severe enough to force a construction worker to miss work for several days or to change occupations.

The Bureau of Labor Statistics (BLS) category, "skin diseases or disorders," includes oil acne, chrome ulcers, chemical burns or inflammations, tinea (ringworm), and contact dermatitis, eczema, or rashes caused by primary irritants and sensitizers or poisonous plants (such as poison ivy). BLS does not list frostbite or sunburn as skin diseases or disorders.

The average incidence rate of skin diseases and disorders in 1995 for all industries was 1.2 per 10,000 full-time-equivalent workers. Among goods-producing industries, the rate for agriculture, forestry, and fishing was 4.4; for manufacturing, 1.9; for construction, 1.6; and for mining, 1.2 (Bureau of Labor Statistics ftp web site ostb0445, table R72).

In 1999, the incidence rates of nonfatal skin diseases and disorders varied widely among construction industries; the rate for all construction had declined by one-third from 1995, when it was 4.5 cases per 10,000 full-time workers (see chart 46a). In 1995, the most recent year for which data on days away from work were available for key construction industries, skin disorders caused concrete workers to lose much more work than did other construction workers (chart 46b). (See chart book page 33).

Concrete, which is widely used in masonry, floor laying, and other occupations, is a mix of portland cement (calcium, silica, iron, and alumina), sand, aggregate, and water. Fly ash, gypsum, and blast-furnace slag may be added to produce blended-cement products. Contact with wet concrete can cause both irritant and allergic contact dermatitis. Irritant dermatitis, which can be acute or chronic, is caused by the concrete's alkaline and abrasive properties. Irritant dermatitis can also be caused by solvents, soaps, asphalt, dust, fiberglass, abrasives and mechanical trauma or friction.

Allergic dermatitis may be caused by persistent contact with hexavalent chromium, which is in most portland cement; other causes of allergic dermatitis include cobalt, nickel, rubber gloves or boots, epoxy resins, asphalt and coal tars, some sawdusts, and poison ivy.¹

Hexavalent chromium is water soluble and thus can penetrate the skin. Chromates are one of the main causes of allergic dermatitis among workers.² Some 5 to 15% of workers coming into contact with portland cement that contains hexavalent chromium suffer allergic contact dermatitis at a rate well over 25 times the rate for allergic dermatitis in the general population (Christian Avnstorp, University of Copenhagen, Denmark, personal communication, 1996). Allergic contact dermatitis that develops after cement exposure may persist in 20 to 40% of workers who have reacted to hexavalent chromium, even without further exposures to the substance (James Nethercott, University of Maryland, personal communication, 1997). Since 1981, Denmark, Finland, and Sweden have reduced hexavalent chromium levels in cement to below 2 parts per million and have reported a reduction in skin problems.

In Finland, from the years just before 1987 legislation reduced chromium levels until a decade later, the rate of reported (and medically confirmed) cases of allergic dermatitis declined 80% (chart 46c). At the same time, the number of reported cases of irritant dermatitis — caused by contact with other irritants in wet cement — remained constant.³

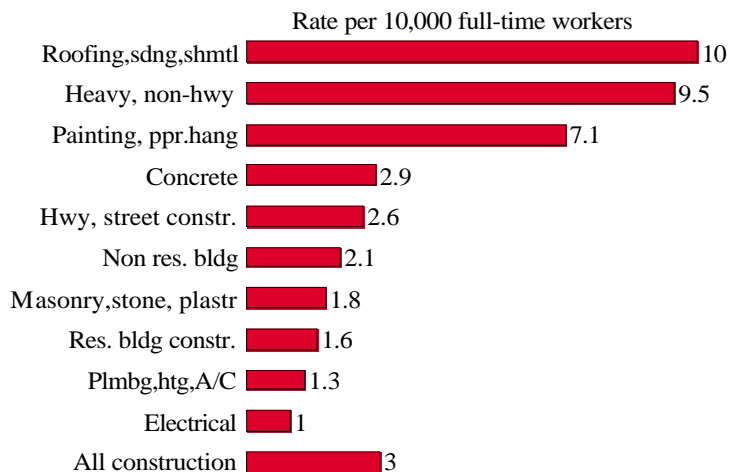
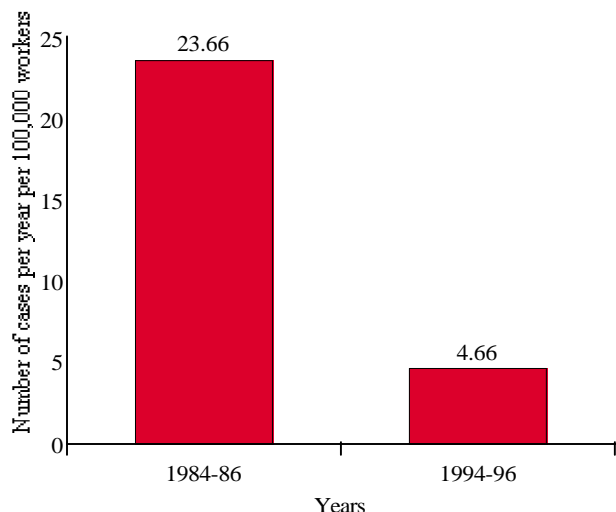
Although Denmark, Finland, and Sweden report success in reducing hexavalent chromium levels in cement, there is still discussion in some European countries about the benefits of the method used, adding ferrous sulfate to cement. In Belgium and Holland, statistics show that the numbers of new cases of chromium allergies have fallen without modifying the cement. The concentrations of chromium in cement differ from country to country, depending on the raw materials.

Approaches to the problem of hexavalent chromium in portland cement are being considered in the United States. But some in the U.S. cement industry say adding ferrous sulfate may not work, because of the large number of cement manufacturing plants (more than 120), wide variations in hexavalent chromium content in cement, and time delays between cement manufacturing and use. The time delays are of concern because ferrous sulfate may lose its effectiveness over time, depending on how cement is packaged and on water and temperature conditions.

1. Robert M. Adams, *Occupational Skin Disease*. New York: Grune & Stratton, Inc., 1983.

2. See, for instance, David Burrows, Adverse chromate reactions on the skin. In: Torkil Menne and Howard I. Maibach, eds., *Chromium: Metabolism and Toxicology*. Boca Raton: CRC Press, 1983, 137.

3. Pekka Roto, Hannele Sainio, Timo Reunala, and Pekka Laippala, Addition of ferrous sulfate to cement and risk of chromium dermatitis among construction workers, *Contact Dermatitis*, 1996, 34:43-50.

46a. Rate of nonfatal work-related skin diseases and disorders, by construction industry, 1999**46b. Median number of days away from work for nonfatal skin disorders, by construction industry, 1995****46c. Rate of work-related allergic dermatitis among construction workers in Finland, before and after reduction of chromium content in cement (3-year averages)**

Note: Chart 46a - The rate for all industries is 4.9. These data, which cover private in the private sector and exclude the self-employed, are based on employer reports, not employee information (such as that provided in the Current Population Survey).

Chart 46b - Data cover private sector only and exclude all self-employed workers. The median is the mid-point; half of the cases have more days away from work and half have fewer days. Numbers include nonfatal occupational injuries and illnesses, with days away from work, involving disorders of the skin and subcutaneous tissue. Residential builders (general contractors) do not perform all residential construction. Special trades contractors (SIC 17; see page 1) produce 29% of the net value of residential construction work done — and are half the establishments that work primarily in residential construction, according to the 1992 Census of Construction Industries (Eric Belsky, Harvard University Joint Center for Housing Studies, personal communication, March 1998). Data were not available for nonresidential building construction (SIC 154), plumbing, heating, and air conditioning (SIC 171), electrical work (SIC 173), and carpentry and floor work (SIC 175).

Source: Chart 46a - Bureau of Labor Statistics, www.bls.gov, table S14.

Chart 46b - William Weber, Bureau of Labor Statistics, personal communication, January 1998.

Chart 46c - Pekka Roto, Institute of Occupational Health, Helsinki, Finland, personal communication, March 1998.